

1.0 INTRODUCTION

On April 7, 1997, Canada and the United States signed *The Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes* also known as the Binational Toxics Strategy, or BNS (EPA 1998a), in keeping with the objectives of the 1987 Great Lakes Water Quality Agreement. The BNS provides a framework for specific actions to reduce and virtually eliminate persistent toxic substances resulting from human activity, especially those which bioaccumulate, that affect or have the potential to affect the Great Lakes ecosystem. The BNS established challenges as significant milestones on the path toward virtual elimination for the following substances: aldrin/dieldrin, chlordane, DDT, mirex, toxaphene, alkyl-lead, benzo(a)pyrene, dioxins and furans, hexachlorobenzene, mercury, PCBs, and octachlorostyrene.

This report reviews the status and use of the pesticides, aldrin/dieldrin, chlordane, DDT, mirex and toxaphene, in the United States. This is the first step in meeting the U.S. challenge related to pesticides.

1.1 Regulatory Framework and Background for the BNS

The Great Lakes hold 18% of the world's supply of surface freshwater. The region is home to 33 million people, 47 percent of whom draw their drinking water from the Lakes. The Great Lakes are also vital habitats to many North American fish and wildlife species. The natural resources provided by the Lakes are key to the economic strength of the region.

During the 1970s, persistent toxic substances were found to be harming Great Lakes species and presenting risks to human and wildlife consumers of fish. Accordingly, under the *Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987* (GLWQA), the United States and Canada pledged to seek the "virtual elimination of the discharge of persistent toxic substances" to the Great Lakes.

Pollution problems in the Niagara River and Lake Ontario again focused public attention on the risks to human, fish and wildlife health in the 1980s. These concerns led to the negotiation and signing, separate from the 1987 GLWQA, of the four-party *Niagara River Declaration of Intent* (DOI) in 1987, and the development of the *Lake Ontario Toxics Management Plan*, which has been incorporated into the *Lake Ontario Lakewide Management Plan* (LaMP) program. The 1987 GLWQA established a process, set of commitments, and general principles for developing and implementing Remedial Action Plans (RAPs) for geographic Areas of Concern (AOCs) and LaMPs.

In 1990, the International Joint Commission (IJC) urged Canada and the U.S. to develop and implement a comprehensive binational program to achieve virtual elimination of persistent toxic substances in the Great Lakes environment. As a result, both Canada and the U.S., in their response to the IJC's *Seventh Biennial Report on Great Lakes Water Quality*, stated their intent to develop such a binational strategy to honor the agreements made in the 1987 GLWQA.

In 1991, the U.S. and Canadian Federal authorities, and authorities from Michigan, Minnesota, Ontario and Wisconsin, developed the *Binational Program to Restore and Protect the Lake Superior Basin (Binational Program)*. The purpose of the Binational Program was to protect the high quality waters of the Lake Superior Basin, to restore degraded areas therein, and to achieve zero discharge of designated persistent and bioaccumulative toxic substances from point sources in the Basin.

In 1994, the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA)* was established to implement the 1987 GLWQA. In 1995, the final *U.S. Water Quality Guidance for the Great Lakes System (GLI)* was published, establishing a process for developing consistent water quality standards across the Great Lakes system.

The *Great Lakes Binational Toxics Strategy*, signed on April 7, 1997 builds on and complements the preceding national and regional agreements, and the corresponding actions to eliminate toxic releases into the Lakes. The Binational Strategy includes challenges for the “virtual elimination” of use and release of five toxic pesticides: aldrin/dieldrin, chlordane, DDT, mirex, and toxaphene. These so-called “Level I” pesticides have been associated with widespread, long-term adverse effects on wildlife in the Great Lakes Basin, and, through their bioaccumulation, are of concern for human health.

1.2 BNS US and Canadian Challenges

The U.S. Environmental Protection Agency (EPA) and Environment Canada (EC) formulated the following challenges as significant milestones towards eliminating the five Level I pesticides in the Great Lakes Basin:

U.S. Challenge: Confirm by 1998 that there is no longer use or release from sources that enter the Great Lakes Basin of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from outside of the U.S. are confirmed, work within international frameworks to reduce or phase out releases of these substances.

Canadian Challenge: Report by 1997, that there is no longer use, generation or release from Ontario sources that enter the Great Lakes of five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), and of the industrial byproduct/contaminant octachlorostyrene. If ongoing, long-range sources of these substances from outside of Canada are confirmed, work within international frameworks to reduce or phase out releases of these substances.

Octachlorostyrene is covered in a separate report.

1.3 Reasons for Listing of Level I Pesticides

The Level I pesticides were selected for the Binational Toxics Strategy on the basis of their previous nomination to lists relevant to the pollution of the Great Lakes Basin ecosystem. These lists included the Bioaccumulative Chemicals of Concern from USEPA's water quality guidance for the Great Lakes, substances identified by the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem, substances identified as critical pollutants by the International Joint Commission, and substances designated "Lakewide Critical Pollutants" in Lakewide Management Plans.

1.4 Other Related National and International Programs Addressing Reduction of Pesticides in the Environment

U.S. Regulations and Programs

In the United States, the Clean Air Act, the Clean Water Act, the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resources Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Federal Insecticide and Rodenticide Act (FIFRA), and other Federal, regional, and State programs govern the use, release, or control of the substances identified in the BNS.

PBT Strategy - On November 16, 1998, the U.S. EPA released a draft *Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants*. The goal of the strategy is to further reduce risks to human health and the environment from existing and future exposure to priority PBT pollutants. EPA will coordinate its use of statutory authorities and resources to maximize public health and environmental protection. Environmental results anticipated from implementing the strategy will derive from stronger multi-media coordination among national and regional EPA programs. The strategy will be coordinated with the Binational Toxics Strategy, complementing the BNS by extending the scope of selected actions nationwide, selecting additional substances for action beyond the Level I substances, and providing scientific support for deciding whether more action is needed after the challenge goals are met.

Canadian Regulations and Programs

In Canada, the Canadian Environmental Assessment Act, Canadian Environmental Protection Act, the Fisheries Act, the Pest Control Products Act, the Ontario Environmental Assessment Act, Ontario Environmental Protection Act, the Ontario Water Resources Act, and other federal and provincial acts guard the Great Lakes Basin ecosystem.

The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA) was established in 1994 to satisfy the requirements of the 1987 Great Lakes Water Quality Agreement (GLWQA). The signing of the Binational Toxics Strategy by Canada and the U.S. is viewed as a milestone in Canada's efforts toward restoring and protecting the Great Lakes under the 1994 COA, as well as the 1987 GLWQA. As the first step in meeting the Canadian Challenge, Environment Canada and the Ontario Ministry of Environment and Energy produced a report entitled "*Confirmation of No*

Production, Use or Import in the Commercial Sector in Ontario” which was published in October 1996. This report confirmed that all five pesticides were no longer being manufactured in Canada and that all registered uses have been canceled.

Great Lakes Programs

As discussed above, there are a number of programs focused solely on pollution prevention and virtual elimination efforts in the Great Lakes. The BNS strategy aims to productively build on prior and existing Great Lakes initiatives including the 1987 GLWQA, RAPs, LaMPs, the Niagara River Declaration of Intent, the State of the Lakes Ecosystem Conference (SOLEC), and extensive work by the International Joint Commission (IJC).

Other International Programs

Internationally, related efforts include a legally-binding protocol on persistent organic pollutants (POPs) negotiated in February 1998 by members of the United Nations Economic Commission for Europe (UNECE) under the Convention on Long-Range Transboundary Air Pollution (LRTAP). The objective of the LRTAP protocol is to control, reduce, or eliminate discharges and releases of persistent organic pollutants. These include many of the same substances targeted by the BNS. In June 1998, 55 member countries signed the LRTAP protocol, which regulates sixteen compounds, prohibiting the production and use of the following Level I pesticides: aldrin, chlordane, dieldrin, mirex, and toxaphene.

As a result of the formation of the North American Free Trade Association (NAFTA), another international working group specific to pesticides has been formed. The NAFTA Technical Working Group (TWG) on Pesticides was formed in 1996 to ease regulatory tensions related to pesticides. This work has already begun by addressing specific trade irritants, often caused by national differences in Maximum Residue Limits (MRLs or tolerances), developing a better understanding of each regulatory agency's assessment practices, working to harmonize each country's procedures and requirements and encouraging pesticide registrants (product owners) to make coordinated data submissions to the three NAFTA countries.

The Commission for Environmental Cooperation (CEC), established by the North America Agreement on Environmental Cooperation between the governments of Canada, Mexico and the U.S., has formed a working group to develop and implement regional action plans. This group has produced two documents related to the Level I pesticides to date: the "North American Regional Action Plan on DDT" and the "North American Regional Action Plan on Chlordane."

1.5 National and International Programs for Tracking Pesticides in the Environment

Pollutant Release and Transfer Registries

All of the Level I pesticides are listed as toxic chemicals under the Emergency Planning and Community Right-to-Know Act. Estimates of releases of these chemicals into the air, water or land must be

reported annually and entered into the national United States Toxic Release Inventory (TRI), which has tracked these data since 1987.

Canada, Mexico and some European countries also have pollutant release and transfer registries. In Canada, the National Pollutant Release Inventory (NPRI) first reported their releases and transfers for the year 1993. In Mexico, the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) is in the process of being implemented. Note that Canada does not require reporting of any of the Level I pesticides, primarily because they are either no longer, or never were, produced in that country.

Other U.S. Pesticide Monitoring Programs – Most of the Great Lakes States have programs in place which investigate pesticide storage and loading sites for contamination of soils. The goal of these programs is to ensure that no leaching to ground water or contamination of surface waters occurs.

Important environmental monitoring programs include:

- The Integrated Atmospheric Deposition Network (IADN) which is a joint Canadian - U.S. monitoring and research program which has been in operation since January, 1990. The goal of the program is to measure selected toxics in the atmosphere in the Great Lakes Basin in order to estimate the loading to the Basin of these substances. Currently the program consists of seasonal sampling at 5 master stations and 14 satellite stations for a wide range of semivolatile organic compounds and metals. Level I pesticides routinely monitored include dieldrin, DDT and its metabolites, and three principal components of technical chlordane. Toxaphene and mirex are measured at some stations.
- The National Water Quality Assessment (NAWQA) Program, administered by the USGS, involves sampling and analysis of a variety of organic and inorganic constituents in rivers and streams in the United States. The program is divided into 59 study areas, 4 of which include streams and rivers flowing into the Great Lakes Basin. A subset of the Level I pesticides are included as part of this monitoring program (DDT+ metabolites, three principal components of technical chlordane, and dieldrin).
- The National Oceanic and Atmospheric Administration's (NOAA) Mussel Watch Project has been using measurements of contaminants in mussel and oyster tissues since 1986 to evaluate the status and trends in contaminant levels in marine waters around the U.S. coasts. In 1992, this Mussel Watch Project was expanded to include measurement of contaminants in dreissenid bivalves, zebra and quagga mussels along the U.S. shores of the Great Lakes (Robertson and Lauenstein, 1998). A series of sites, including locations in all of the Great Lakes but Lake Superior, was established for collection of dreissenid mussels. These sites are visited approximately biennially for collection of animals to be analyzed for a suite of over 70 contaminants. Included are aldrin, dieldrin, cis-chlordane, mirex and DDT+ metabolites.

2.0 OVERVIEW OF FEDERAL AND STATE REGULATIONS GOVERNING PESTICIDES

2.1 Historical Perspective of Federal Regulations

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA or the Act) regulates the sale, distribution, and use of pesticides. When this act was passed on June 25, 1947, it was primarily a consumer protection statute focused on the registration and labeling of pesticides; the regulation and enforcement of FIFRA was under the jurisdiction of the United States Department of Agriculture (USDA). In 1970, the United States Environmental Protection Agency (U.S. EPA) was created and enforcement of the pesticide regulations under FIFRA was transferred to U.S. EPA at that time. In 1972 FIFRA was amended to add the term “unreasonable adverse effects on the environment,” and a series of changes were made to give U.S. EPA (the Agency) authority to regulate pesticides to prevent unreasonable adverse effects on the environment. Major revisions to FIFRA were made in 1988 which required registrants to bring older registered pesticides up to modern standards under “reregistration” provisions. Additional major revisions were made in 1996 with the Food Quality Protection Act which added special consideration for children, endocrine disrupters, and multiple chemical exposure.

Registration and labeling of pesticides remain the basis of the FIFRA regulatory program. To register a pesticide, an applicant must submit many documents, including a copy of the product’s labeling and a description of the tests performed on the product that show that under the conditions of the product’s intended use, it would not cause unreasonable adverse effects on human health or the environment. In addition, if at any time after the registration of a pesticide the registrant has additional factual information regarding unreasonable adverse effects on the environment from the use of the pesticide, the registrant shall submit such information to the Administrator of the U.S. EPA.

2.2 Cancellation of a Pesticide Registration

A pesticide registration may be canceled for several reasons including:

1. Voluntary cancellation by the registrant;
2. Failure by the registrant to support the continuation of the registration through payment of maintenance fees;
3. Failure by the registrant to submit additional data required by U.S. EPA (data call-in actions);

4. By administrative action, if it appears that a pesticide generally causes unreasonable adverse effects on the environment when the pesticide is used in accordance with its labeling and with widespread and commonly recognized practice. In such a case, the Administrator would either issue a notice of intent to cancel the registration, or issue a notice to hold a hearing to determine whether or not its registration should be canceled or its classification changed. In either event, the U.S. EPA Administrator would consult with the Secretary of Agriculture in order to take into account an analysis of the impact of cancellation on the prices of agricultural commodities, retail food prices or other effects on the agricultural economy. All such notices and analyses shall be published in the Federal Register.

Under a cancellation order, the continued sale and distribution of existing stocks is generally allowed for a specific period of time - usually not more than twelve to eighteen months. End users may apply the product until exhausted under labeled restrictions unless food or feed crops are involved. No use on food or feed crops are allowed once tolerances (allowed pesticide residue limits) are revoked.

2.3 Suspension of a Pesticide Registration

An order can be issued by the Administrator to immediately *suspend* the registration of a pesticide if it is determined that such action is necessary to prevent an imminent hazard during the time required for cancellation or change in classification proceedings. Also, a notice of intent to cancel the registration or change the classification of the pesticide must be issued in the event of a “suspension order.” If the registration of a pesticide has been suspended and canceled, a voluntary or mandatory recall of the remaining stocks of the pesticide can be ordered.

2.4 Delegation, Cooperation and Authority of States

All of the eight Great Lakes States have entered into cooperative agreements with the U.S. EPA for the enforcement of FIFRA. Such cooperative agreements contain provisions for the training and certification of pesticide applicators, the inspection of producing establishments, marketplaces and certified applicators, and the investigation of citizen complaints and other matters related to pesticide issues.

The States may regulate the sale and use of federally registered pesticides, but cannot permit sales or uses prohibited under FIFRA. A State may register a pesticide for additional uses of federally registered pesticides to meet special local needs, provided the pesticide use has not been previously denied, disapproved or canceled by the U.S. EPA, and, in the case of food or feed uses, there exists a tolerance or exemption under the Federal Food, Drug and Cosmetic Act.

A State may apply for an exemption under Section 18 of FIFRA for the use of an

unregistered pesticide to respond to emergency conditions within the State. Such emergency exemptions must be approved by U.S. EPA.

2.5 The Role of TSCA

Although the major uses registered for the pesticide compounds of interest under the BNS were pest control, some of these compounds were used for other purposes (e.g. Mirex; fire retardant, Color Enhancer for Pyrotechnics etc.). The status of these uses are not affected by FIFRA registration cancellations. However, another means of controlling the use, manufacture or distribution of potentially harmful chemicals is through the Toxics Substance Control Act (TSCA). Under TSCA, manufacture, processing or distribution of a substance can be either prohibited or limited. However, TSCA regulatory action is much more difficult to enact than FIFRA, and none of the Level I pesticide compounds addressed by the BNS have been ruled on under TSCA.

2.6 Import/Export Status

At present, the United States has no legislative authority to prohibit the production or export of canceled pesticides. However, canceled pesticides are subject to the export notification requirements of the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA), which means that for each shipment, the manufacturer must obtain a statement from the foreign purchaser, indicating the purchaser's awareness that the product is not registered for use in the United States. That statement is then transmitted by the EPA to the government of the importing country (NARAP, 1997a,b). This program is often referred to as the "International Right to Know" program, or more officially, as the Prior Informed Consent.